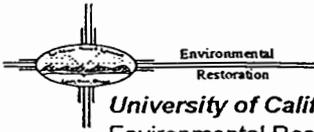


Los Alamos National Laboratory

ENVIRONMENTAL RESTORATION



University of California
Environmental Restoration, MS M992
Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747



U. S. Department of Energy
Los Alamos Area Office, MS A316
Los Alamos, New Mexico 87544
505-665-7203
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Date: April 19, 1996
Refer to: EM/ER:96-220

Mr. Benito Garcia
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: FINAL ACCELERATED CLEANUP REPORTS C-21-027

Dear Mr. Garcia:

Enclosed are the final reports and Certifications of Completion for the voluntary corrective actions completed in Fiscal Year 1995. The reports with potential release sites (PRSS) listed in the Hazardous and Solid Waste Amendments (HSWA) Module of the Los Alamos National Laboratory's Resource Conservation and Recovery Act operating permit contain our request for no further action (NFA). Upon your approval of these reports, we will submit a permit modification request for NFA of these PRSS.

For PRSS not listed in the HSWA Module, reports are included as informational copies for your records.

If you have any questions, please call David Bradbury at 505-665-6208.

Thank you for your timely attention to this matter.

Sincerely,


Jorg Jansen, Program Manager
Environmental Restoration

Sincerely,


Theodore Taylor, Program Manager
Los Alamos Area Office

JJ/TT/rfr



10220

- Enclosures: (1) Final Reports for HSWA: C-9-001, 6-007(f), 8-005, 16-016(b), 18-001(a), 19-002, 21-013(c), 21-013(d), 21-013(e), 21-024(d), 21-024(e), 21-024(h), 31-001, 33-016, 39-007(a), and 69-001
- (2) Final Reports for non-HSWA: C-0-036(a-d), C-0-041, C-10-001, C-21-027, C-36-001, 0-032, 1-001(f), 3-003(p), 3-022, 3-047(d), 3-051(c), 9-010(a-b), 16-011, 16-016(f), 20-003(c), 21-022(j), 39-002(c), 53-010, and 57-006
- (3) Certifications of Completion

Cy (w/enclosures):

B. Driscoll, EPA, R.6, 6PD-N, (2 copies of HSWA)
D. Griswold, ERD, AL, MS A906
/ J. Harry, EM/ER, MS M992
B. Hoditschek, NMED-HRMB
/ R. Kern, NMED-HRMB
N. Naraine, EM-453, DOE-HQ
M. Shaner, P&PI, MS J591 (5 copies)
N. Weber, Bureau Chief, NMED-AIP, MS J993
J. White, ESH-19, MS K490
S. Yanicak, NMED-AIP, MS J993
RPF, MS M707

Cy (w/o enclosures):

T. Baca, EM, MS J591
D. Bradbury, EM/ER, MS M992
T. Glatzmaier, DDEES/ER, MS M992
D. McInroy, EM/ER, MS M992
G. Rael, ERD, AL, MS A906
W. Spurgeon, EM-453, DOE-HQ
T. Taylor, LAAO, MS A316
J. Vozella, LAAO, MS A316
EM/ER File, MS M992

Voluntary Corrective Action Completion Report for

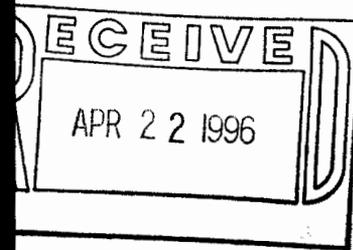
Potential Release Site
C21-027
TA-21 Cooling Tower

Field Unit 1

Environmental Restoration Program

February 1996
Revision 1

A Department of Energy
Environmental Cleanup Program



Los Alamos

NATIONAL LABORATORY

LA-UR-96-247

**Voluntary Corrective Action Completion Report
Potential Release Site C21-027
TA-21 Cooling Tower**

**Environmental Restoration Project
Field Unit One
Los Alamos National Laboratory**

Revision 1

January 22, 1996

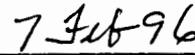
**A Department of Energy
Environmental Cleanup Project**

CERTIFICATION OF COMPLETION

I certify that all the work pertaining to the voluntary corrective action (VCA) at PRS C21-027 has been completed in accordance with the Department of Energy approved VCA plan entitled *Voluntary Corrective Action Plan for TA-21 Sump and Cooling Tower Sites*. Based on my personal involvement or inquiry of the person or persons who managed this clean up, a review of all data gathered, and a visit to the site, to the best of my knowledge and belief all criteria of the plan have been met or exceeded. I believe that the completion of this VCA is both protective to human health and the environment. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.



Garry Allen
Field Unit One Project Leader
Environmental Restoration Project
Los Alamos National Laboratory



Date signed

Voluntary Corrective Action Completion Report

Potential Release Site C21-027

TA-21 Cooling Tower

DESCRIPTION

The potential release site (PRS) C21-027 is the site of structure TA-21-143, a cooling tower (chilled water recirculator) that received water from Building TA-21-3, circulated it, and returned it to the building in a closed loop. PRS C21-027 is not listed in the Hazardous and Solid Waste Amendments (HSWA) module of Los Alamos National Laboratory's (LANL's) Resource Conservation and Recovery Act (RCRA) permit but was listed in Chapter 19.2 of the Technical Area 21 (TA-21) RFI work plan¹ as an area of concern (AOC).

The cooling tower occupied an area approximately 10 ft by 20 ft. The above-ground section of the cooling tower was removed (along with the south portion of Building TA-21-3) in 1994 by the Decontamination and Decommissioning Program, and the below-ground section was removed in April 1995. No information was available from previous investigations to determine whether hazardous or radioactive contamination remained at this site. It was expected that any contamination was removed during decontamination and decommissioning.

CORRECTIVE ACTION

PRS C21-027 at Field Unit 1, TA-21 at LANL was selected for voluntary corrective action (VCA). A VCA plan was prepared, and the plan was approved by the Department of Energy (DOE).^{2,3} The VCA was conducted according to the plan with minor deviations (noted below). This report provides the results of the VCA.

Action on this PRS was begun in 1994 when decontamination and decommissioning operations removed the contaminated structures that stood above ground on this site and continued in April 1995 when the below-ground sections were removed. Documentation that the remedy was completed is provided by confirmatory sampling discussed in this report.

In compliance with the approved VCA plan, three confirmatory samples from one location in the center of the footprint of the former cooling tower (Fig. 1) were collected. Samples were collected at 0-to-6 in., 6-to-12 in., and 12-to-18 in. intervals using a hand auger.

To ensure worker health and safety and to meet the requirements of the fixed analytical laboratory, samples were screened for radiation using hand-held field instruments and mobile laboratory techniques. To confirm the absence of contaminants following corrective action, samples were sent to a fixed laboratory and analyzed for gamma-emitting radionuclides, tritium, isotopic uranium, isotopic plutonium, isotopic thorium, strontium-90, americium-241, semivolatile and volatile organic compounds, and metals, as stated in the approved VCA plan.

All wastes were disposed of through the TA-21 decontamination and decommissioning process.

¹ TA-21 Operable Unit RFI Work Plan for Environmental Restoration, May 1991.

² Voluntary Corrective Action Plan for TA-21 Sump and Cooling Tower Sites, August 9, 1995.

³ Memo LAAO:EP:TJT:VCA:1.4.2.5.3.3.17, from Theodore J. Taylor to J. Jansen, August 1995.

The remedy was completed with the following deviations from the approved VCA plan.

- Sample locations were surveyed to provide exact coordinates, which was not required explicitly in the plan.
- Samples were not screened for volatile organic compounds in the field as planned because experience from decontamination and decommissioning operations indicated that such contaminants were not present at this site.
- Samples were analyzed for isotopic uranium rather than total uranium (as planned) to provide a more complete characterization.

RESULTS

The results of confirmatory sampling are presented in Tables 1 and 2. Copies of all data reports are available and will be provided upon request.

No volatile or semivolatile organic compounds were present at levels greater than the minimum level the analytical method could detect. All detected metals and radionuclides were present at levels less than the screening action level,⁴ and all but calcium, chromium, plutonium-239, and uranium-235 were present at levels less than or equal to the upper tolerance limit⁵ and the process area baseline.⁶ (Note that for strontium-90, the upper tolerance limit and the process area baseline are less than the minimum amount the analytical method could detect.)

CONCLUSIONS

No samples were found to contain contaminants at levels greater than screening action levels. We conclude that the decontamination and decommissioning activities have accomplished all necessary remediation at PRS C21-027. This PRS, which is associated with cooling tower structure TA-21-143, should be removed from the list of Environmental Restoration Project PRSs. This report serves as the formal request for DOE concurrence to approve no further action at PRS C21-027.

⁴ Action level developed for Environmental Restoration Project screening assessments; documented in *Installation Work Plan for Environmental Restoration*, Appendix J, September 1994.

⁵ Limit at the 95th percentile with a 95% confidence level of a range of regional background concentrations; documented in *Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico*, LA-UR-95-3468. For americium-241, cesium-137, tritium, plutonium-238 and -239, strontium-90, and thorium-230, the limit at the 95th percentile has not been calculated so the limit at the 99th percentile with a 95% confidence level of a range of regional background concentrations was used; documented in *Statistical Comparisons to Background, Part I*, LA-UR-95-1217, March 28, 1995.

⁶ A comparison value developed from the 95.5% confidence level of ambient analyte concentrations in soil from TA-21 process areas; documented in *Phase Report 1C: TA-21 Operable Unit RCRA Facility Investigation*, LA-UR-94-228, February 28, 1994.

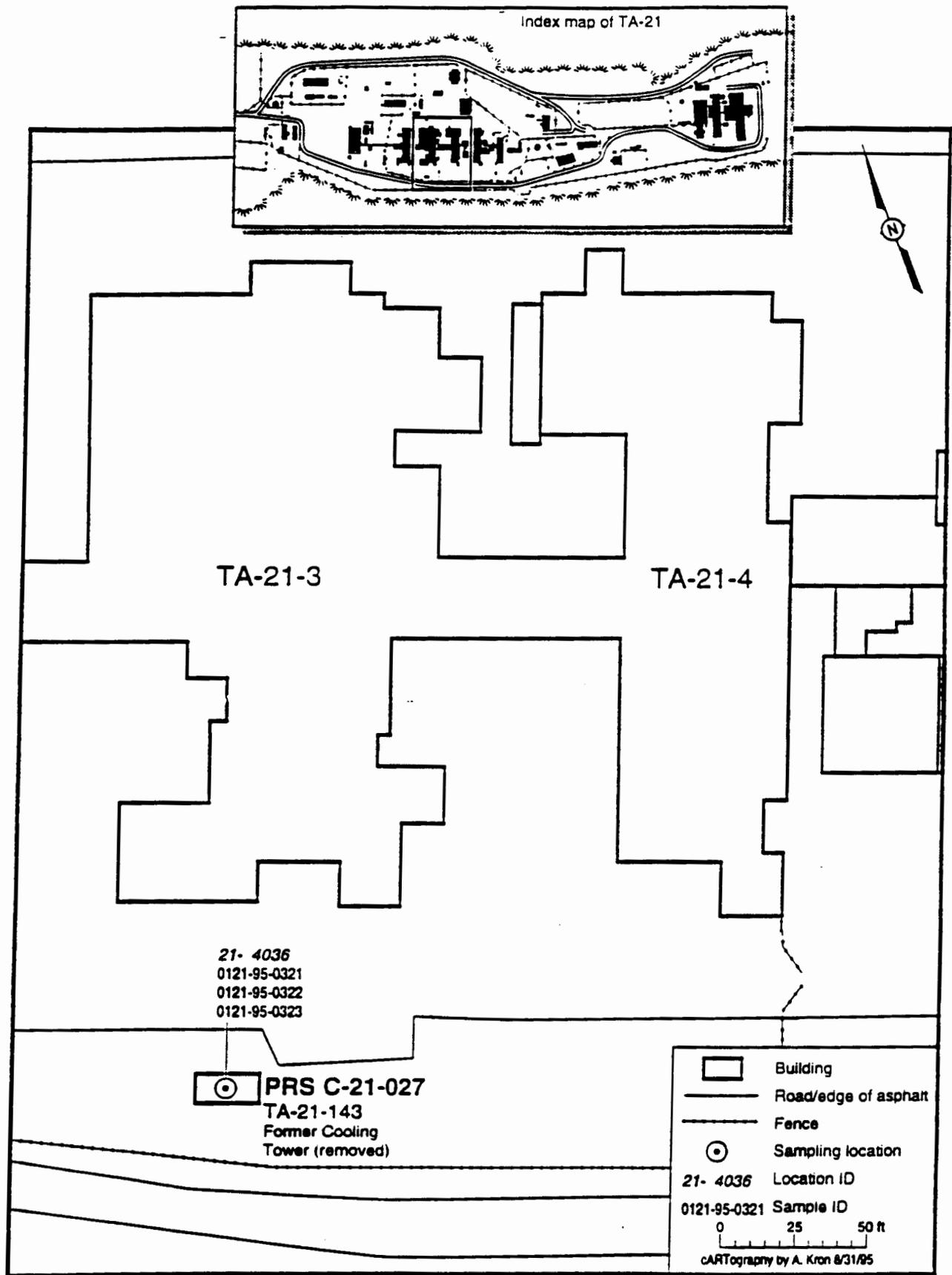


Fig. 1. Location of Confirmatory Samples Collected at PRS C21-027

Table 1. Results of Analyses for Metals at PRS C21-027

Comparison Value	Al (mg/kg)	As (mg/kg)	Ba (mg/kg)	Be (mg/kg)	Ca (mg/kg)	Co (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	K (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Na (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	V (mg/kg)	Zn (mg/kg)
Upper tolerance limit ^a	38,700	7.82	315	1.95	6,120	19.2	19.3	30.7	21,300	3,410	4,610	714	915	15.2	23.3	41.9	50.8
Process area baseline ^b	74,900	3.67	513	4.23	13,880	8.50	21	50.8	23,200	NA ^c	4,760	592	29,600	13.6	56.5	43.4	210
Screening action level ^d	NA ^c	NA ^c	5,600	NA ^c	NA ^c	NA ^c	400 ^e	3,000	NA ^c	NA ^c	NA ^c	11,000	NA ^c	1,600	400	560	24,000

Loc. ID	Sample ID	Depth (in.)	Al (mg/kg)	As (mg/kg)	Ba (mg/kg)	Be (mg/kg)	Ca (mg/kg)	Co (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	K (mg/kg)	Mg (mg/kg)	Mn (mg/kg)	Na (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	V (mg/kg)	Zn (mg/kg)
21-4036	121-95-0321	0-6	12,000	2.4	159	1.0	11,600	5.6	17	7	12,400	1,830	2,710	257	360	9.5	14.6	19.5	37.3
21-4036	121-95-0322	6-12	9,540	2.6	112	0.83	8,360	4.5	16.5	6.3	10,600	1,420	2,030	228	282	7.1	9.5	17.0	31.8
21-4036	121-95-0323	12-18	13,800	2.8	115	0.93	4,560	4.3	104	5.8	13,100	1,800	2,220	182	260	9.2	10.5	19.0	33.3

a Limit at the 95th percentile with a 95% confidence level of a range of regional background concentrations
 b Comparison value developed for the 95.5% confidence level of ambient analyte concentrations in soil in TA-21 process areas
 c Not available
 d Action level developed for Environmental Restoration Project screening assessments
 e Level is for chromium(VI)

Table 2. Results of Analyses for Moisture and Radionuclides at PRS C21-027

Comparison Value	²⁴¹ Am (pCi/g)	¹³⁷ Cs (pCi/g)	³ H (pCi/L)	⁴⁰ K (pCi/g)	²³⁸ Pu (pCi/g)	²³⁹ Pu (pCi/g)	⁹⁰ Sr (pCi/g)	²²⁸ Th (pCi/g)	²³² Th (pCi/g)	²³² Th (pCi/g)	²³⁴ U (pCi/g)	²³⁵ U (pCi/g)	²³⁸ U (pCi/g)
Upper tolerance limit ^a	NA ^b	1.4	NA ^b	28.6	0.014	0.052	1	2.47	1.90	2.47	1.94	0.084	1.82
Process area baseline ^c	0.53	NA ^b	7850	NA ^b	6.21	9.41	0.73	2.05	1.82	1.98	2.03	0.15	2.19
Screening action level ^d	17	4	2,300,000 ^e	NA ^b	20	18	5.9	NA ^b	5	5	86	18	59

Location ID	Sample ID	Depth (in.)	Moisture (%)	²⁴¹ Am (pCi/g)	¹³⁷ Cs (pCi/g)	³ H (pCi/L)	⁴⁰ K (pCi/g)	²³⁸ Pu (pCi/g)	²³⁹ Pu (pCi/g)	⁹⁰ Sr (pCi/g)	²²⁸ Th (pCi/g)	²³² Th (pCi/g)	²³² Th (pCi/g)	²³⁴ U (pCi/g)	²³⁵ U (pCi/g)	²³⁸ U (pCi/g)
21-4036	121-95-0321	0-6	23.0	0.07	0.009	< 2,500	24.2	0.01	0.08	< 2.00	1.2	1.1	0.9	1.41	0.100	0.880
21-4036	121-95-0322	6-12	24.1	0.07	-0.010	< 2,500	24.3	0.0	0.02	< 2.00	0.6	0.8	0.9	1.04	0.060	0.840
21-4036	121-95-0323	12-18	25.3	0.2	-0.014	< 2,500	28.6	0.0	0.05	< 2.00	1.3	0.5	1.0	1.10	0.080	0.870

a Limit at the 99th percentile with a 95% confidence level of a range of regional background concentrations for ²⁴¹Am, ¹³⁷Cs, ³H, ²³⁸Pu, ²³⁹Pu, ⁹⁰Sr, ²²⁸Th; limit at the 95th percentile with a 95% confidence level of a range of regional background concentrations for ⁴⁰K, ²²⁸Th, ²³²Th, ²³⁴U, ²³⁵U, and ²³⁸U.
 b Not available
 c Comparison value developed from the 95.5% confidence level of ambient analyte concentrations in soil from TA-21 process areas
 d Action level developed for Environmental Restoration Project screening assessments
 e Calculated assuming a screening action level of 810 pCi/g of dry soil and 26% soil moisture

DOC TITLE: Final Reports and Cert. Of Completion for VCA's (TA-21 review)

ITEM #	PAGE, SECTION #, OR DRAWING #.	COMMENTS	RESPONSE
1	Page 2 & 4	<p>PRS C-21-027, COOLING TOWER</p> <p>As per EPA, shouldn't the UTL's be calculated based on the 95th percentile with a 95% confidence level of a range of regional background concentrations?</p> <p>PRS 21-022(f), SUMP</p>	<p>Text on p. 2 has been revised to compare sample results to the 95/95 UTLs. Table 2 on p. 4 has been revised to include the 95/95 UTLs, where they are available.</p>
2	Page 1 & 4	<p>PRS 21-022(f), SUMP</p> <p>Was the sump located in building 21-3 as stated in the text on page 1, or in building 21-4 as shown in the figure on page 4?</p>	
3	Page 2 & 5	<p>As per EPA, shouldn't the UTL's be calculated based on the 95th percentile with a 95% confidence level of a range of regional background concentrations?</p>	
4	Page 5	<p>For footnote "f" add the version of RESRAD used (5.191).</p> <p>PRS 21-024(d), SEPTIC SYSTEM AND OUTFALL</p>	
5	Page 2 & 5	<p>As per EPA, shouldn't the UTL's be calculated based on the 95th percentile with a 95% confidence level of a range of regional background concentrations?</p>	
6	Page 2 & 6	<p>For footnotes referencing RESRAD calculations by D&D, add the RESRAD version 5.191.</p>	

REVIEWED BY: Joseph Mose, DOE/LAAO, (505)667-5808

DATE: 11/21/95

REVIEWED BY: _____

DATE: _____

01/03/96 17:32
 SENT BY: DEPT. OF ENERGY
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 ENV. 3 PROJECTS
 4:48PM

ITEM #	PAGE, SECTION #, OR DRAWING #.	COMMENTS	RESPONSE
7	Page 2 & 5	<p>FRS 21-024(e), SEPTIC SYSTEM AND OUTFALL</p> <p>As per EPA, shouldn't the UTL's be calculated based on the 95th percentile with a 95% confidence level of a range of regional background concentrations?</p>	
8	Page 2 & 5	<p>For footnotes referencing RESRAD calculations by D&D, add the RESRAD version 5.191.</p>	
9	Page 2	<p>Footnotes 10 and 11 are the same, delete 11 and change reference in text.</p>	
10	Page 2 & 6	<p>FRS 21-024(h), SEPTIC SYSTEM AND OUTFALL</p> <p>As per EPA, shouldn't the UTL's be calculated based on the 95th percentile with a 95% confidence level of a range of regional background concentrations?</p>	
11	Page 2 & 6	<p>For footnotes referencing RESRAD calculations by D&D, add the RESRAD version 5.191.</p>	

REVIEWED BY: Joseph Moss, DOE/LAAO, (505)667-5808

DATE: 11/21/95

REVIEWED BY: _____

DATE: _____

SENT BY: DEPT. OF ENERGY : 1- 2-96 : 1:48PM : ENV. & PROJECTS : 2500004032.m